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MATE VAN

MOBILE ANALYSIS AND TRAINING EXTENSION

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NASA
National Aeronautics and
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MATE PROFILE

A key role of the National Aeronautics & Space Administration (NASA) is the research and development of new technology for the benefit of man. For over three years, NASA's Regional Remote Sensing Applications Program has been assisting state and local governments in the use of Landsat satellite data for natural resource and environmental management.

Ames Research Center (ARC), Moffett Field, California was one of three NASA Regional Centers selected to work hand-in-hand with these agencies and their users to provide an opportunity to test and evaluate remote sensing technology. Other centers are located at Goddard Space Flight Center, Greenbelt, Maryland and the National Space Technology Laboratories, Slidell, Louisiana.

At ARC, the Western Regional Applications Program (WRAP) was established to serve the 14 western United States including Alaska and Hawaii. The program is based on a cooperative approach in which the technology application is driven by the user's needs.

Dr. Dale Lumb of NASA/Ames is presented the keys to the MATE Van by Richard Weinstein and Floyd Roberson of NASA Headquarters (left to right) during the MATE's commissioning ceremony in Monterey, CA.

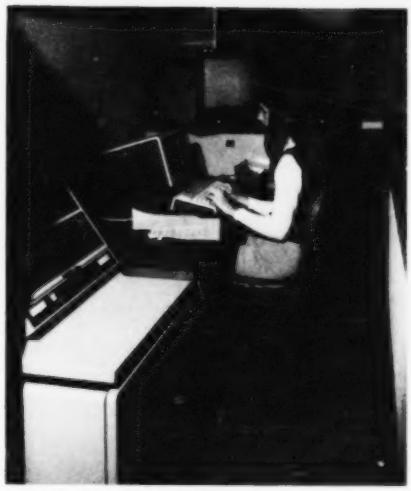
WRAP activities focus on assisting users in analyzing digital data scenes of the Earth generated by the Landsat satellite in conjunction with other data to provide useful natural resource assessments such as crop/forest inventories, land use planning and coastal zone management.

To support these far reaching activities, a unique mobile laboratory called MATE was commissioned in Monterey, California during the first Western Regional Remote Sensing Conference in October, 1979. The MATE (Mobile Analysis & Training Extension) Van is a modified 30 foot motor coach with modern computer processing equipment used to train personnel and to demonstrate useful techniques and capabilities for the analysis and applications of Landsat satellite imagery.

WRAP PROGRAM OBJECTIVES

Demonstration

To introduce users in government, industry and academic institutions to the potential applications of Landsat technology.

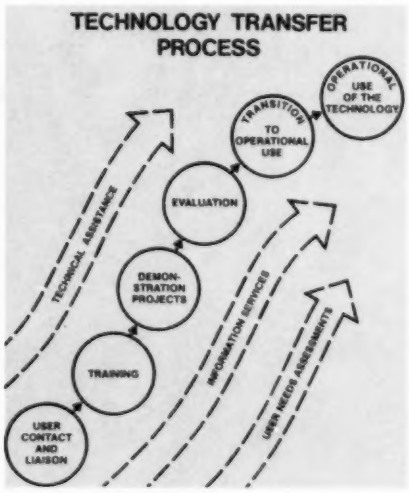


Analysis

To provide users with hands-on experience in analyzing satellite data as an information assessment tool.

Training

To educate users in the techniques of using digital data from Landsat for their specific needs.



Technology Transfer

To prepare the users to interact with Landsat data on an independent operational basis.

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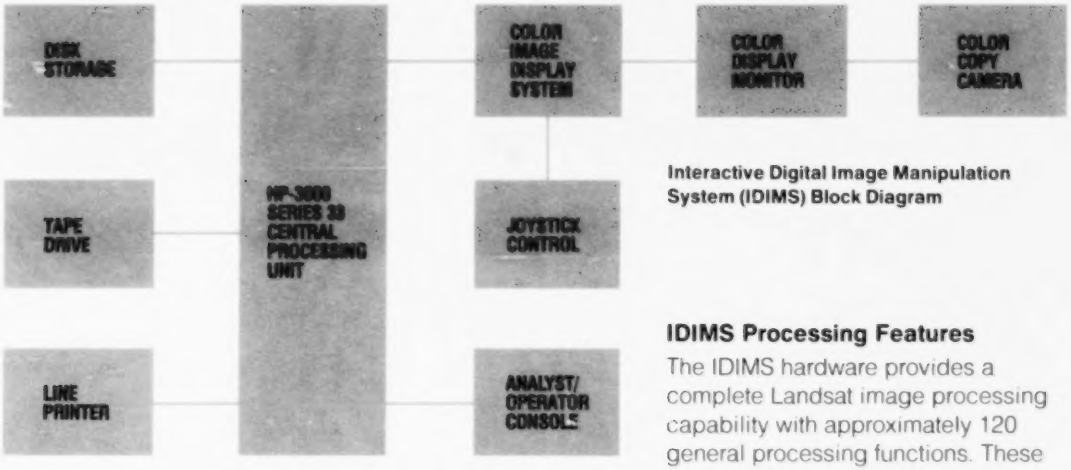
IMAGE PROCESSING CAPABILITY



Interactive Digital Image Manipulation System (IDIMS) Block Diagram

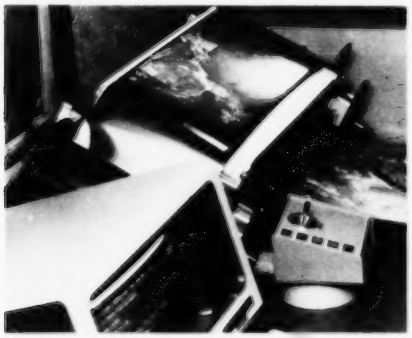
The central capability of the MATE Van is the Interactive Digital Image Manipulation System (IDIMS) developed by ESL Incorporated of Sunnyvale, California. The heart of the system is a Hewlett-Packard 3000 Series 33 minicomputer and system console with accompanying peripheral equipment, including: tape drive, line printer, disk drive, color image display, and color copy camera.

IDIMS Processing Features

The IDIMS hardware provides a complete Landsat image processing capability with approximately 120 general processing functions. These are summarily categorized in the following areas:

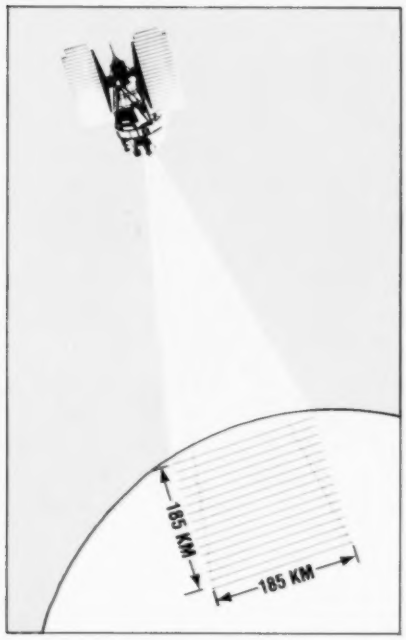
- Arithmetic and utility functions
- Geometric and intensity transformations
- Complex data manipulation functions
- Fourier transformations and spatial filtering
- Image formatting and transfer functions
- Multispectral data processing functions
- Stratification and classification summary functions

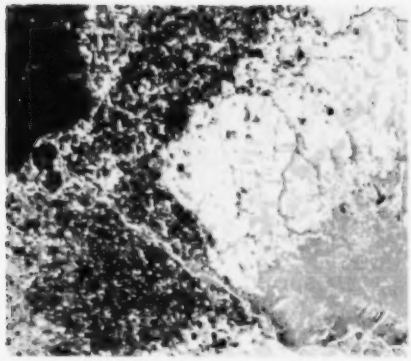
Additional functions provide control and manipulation of the color display, while others regulate operation of the entire system.



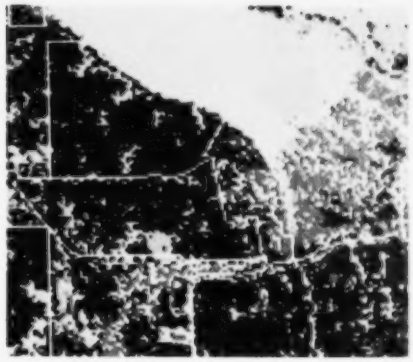
IDIMS Operator Controls

The Landsat satellite circles the Earth in a near-polar orbit obtaining digital images of the surface features in both the visible and near-infrared portion of the spectrum. With the use of computers and field checks, the various land cover features can be interpreted to aid in the management of the Earth's resources and environmental problems. Shown here are false color composites used to interpret and identify many Landsat technological applications.

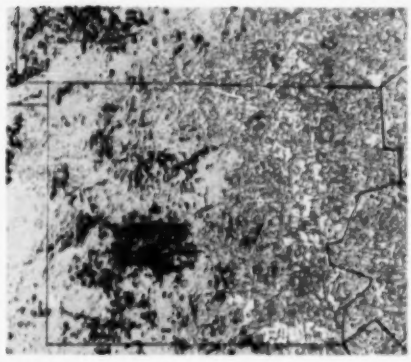




Crop Identification provides an inventory of crop types and irrigated lands along the 2300 sq. mi. bordering the Snake River in Idaho.

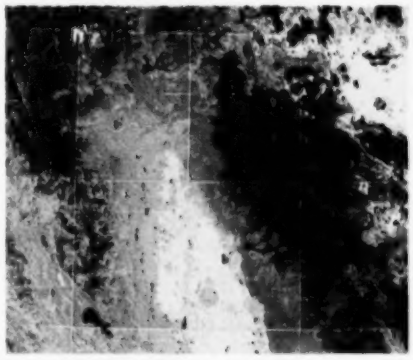


Urban Planning is improved through the use of Landsat data in Tacoma, Washington by monitoring residential and industrial growth trends.

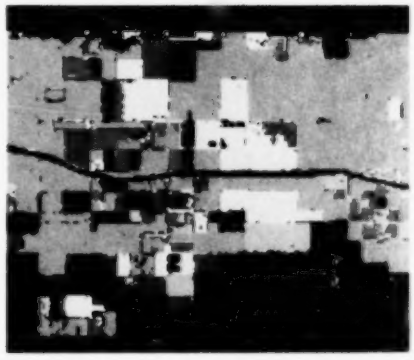


Noxious Weed Control helped to eradicate the Tansy Ragwort, a harmful weed, destructive to both livestock and productive rangeland in Polk County, Oregon.

Land Cover Analysis aids coastal zone management and, over periods of time, detects changes in land cover on the Islands of Hawaii.



Forest Inventories are performed using Landsat data to identify California's timber resources and land cover.



Irrigated Land Assessments provide acreage estimates of the total irrigated land in California's farming areas.

VAN AND EQUIPMENT SPECIFICATIONS

The MATE Van is a modified 30' motor coach manufactured by the FMC Corporation of San Jose, California. Substantial modifications have been made to the van to improve road handling and safety, and to provide the proper operating environment for the computer system and peripherals. Improvements include: sound proofing, air conditioning, suspension system and fire sensing and extinguishing equipment.

MATE Van Interior

Manufacturer/Model
- FMC Corporation 2900 R

Features
- Length 29' 8", width 8' 10",
- Height 9' 1", wheelbase 15' 5",
- Gross vehicle weight 14,500 lbs.

Remote Operations Requirements
- Power—4 wire 208 volt 50 amp circuit
- Phone—2 dedicated lines

Central Processing Unit

Manufacturer/Model
- Hewlett-Packard 3000 Series 33

Features
- 256 K bytes MOS memory
- virtual memory for code
- dynamic relocatability of programs
- overlap CPU—I/O operations

Tape Drive

Manufacturer/Model
- Hewlett-Packard 7970 E

Features
- 9 track, 1600 bits per inch
- 45 inches per second read/write
- up to 10½" reel max
- IBM/ANSI compatible

Disk Storage

Manufacturer/Model
Hewlett-Packard 7925
Features
120 M bytes formatted storage

Color Image Display

Manufacturer/Model
De Anza Systems ID 5424
Features
3 (512 x 512 x 8 bit) RAM refresh memories with lookup table mapping
2 (512 x 512 x 1 bit) RAM overlay graphics planes (color selectable), pseudo color function generator, pan and zoom, joystick control, high resolution color monitor

Color Copy Camera

Manufacturer/Model
Dunn Instruments 631
Features
8 x 10" Polaroid color prints,
8 x 10" or 35mm format negatives and transparencies

Line Printer

Manufacturer/Model
Hewlett-Packard 2608 A
Features
132 columns upper and lower case ASCII
400 lines per minute
6 or 8 lines per inch
plot mode capability

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